

### **REMARKS**

In view of the following remarks, reevaluation and further processing of the application is requested. Prior to amendment herewith, Claims 1-3 and 6-20 were pending in the application. By amendment herewith, Claims 1, 8, and 9 have been amended and Claims 3, 6, and 16-19 have been cancelled. Thus, Claims 1, 2, 7-15 and 20 remain pending in the application.

Claims 1, 8, and 9 have been amended to place those claims in better form for allowance or appeal. Specifically, Claim 1 has been amended to include the limitations of Claims 3 and 6. Claim 8 has been amended to depend from Claim 1, due to the cancellation of Claim 6. Claim 9 has been amended to include limitations similar to those of cancelled Claims 3 and 6, and thus contains similar limitations to Claim 1. Hence, such claim amendments do not present any new matter and thus should be considered by the Examiner. 37 C.F.R. § 1.116.

Applicant would like to thank the Examiner for the telephonic interview held on October 3, 2006. No specific agreements were made during the telephonic interview. However, the Examiner did indicate that the rejections with respect to 35 U.S.C. § 112 might be overcome using the amended claim language and the limitations of Claims 3 and 6, provided such limitations are supported by the specification.

### **Rejections Under 35 U.S.C. § 112**

In the Office Action, the Examiner rejected Claims 1-3, 6-10 and 14-20 under 35 U.S.C. 112, both first and second paragraph. Applicant respectfully submits that those claims were compliant with 35 U.S.C. § 112. Nonetheless, Applicant has amended Claim 1 to remove reference to the "predetermined action" language, and, instead, has adopted the Examiner's suggestion to utilize the limitations of Claims 3 and 6 in Claim 1. More particularly, step (d) of Claim 1 now provides, that, when the actual temperature varies from the target temperature by more than a preselected limit, at least one of the following actions is accomplished:

- (i)(1) increasing the actual rate of aluminum fluoride addition above the standard rate when the actual temperature is greater than the target temperature;

- (i) (2) reducing the actual rate of aluminum fluoride addition below the standard rate when the actual temperature is less than the target temperature; and
- (ii) inspecting the crust for crust holes, and repairing any of the crust holes, the repairing step comprising covering said crust holes with solid particles.

Support for accomplishing those steps when the actual temperature varies from the target temperature by more than a preselected limit may be found at, for example, original Claims 4 and 5. Support for steps (i)(1) and (i)(2) may be found at, for example, original Claim 3. Support for step (ii) may be found at, for example, original Claims 1 and 6. Thus, Applicant respectfully submits that Claim 1 is compliant with 35 U.S.C. § 112.

For many of the same reasons, Claim 9 also complies with 35 U.S.C. § 112. Claim 9 also has been amended to recite many of the same limitations as Claim 1. Thus, Applicant respectfully submits that Claim 9 is also compliant with 35 U.S.C. § 112.

Applicant submits that Claim 14 also complies with 35 U.S.C. § 112. Claim 14 recites the step of adding aluminum fluoride at about the standard addition rate when the actual temperature is about equal to the target temperature. Support for Claim 14 may be found at, for example, original Claim 12.

Applicant submits that Claim 15 also complies with 35 U.S.C. § 112. Claim 15 recites that the comparing step of Claim 1 (step (c)) comprises transmitting a thermal image of the chamber from the infrared sensor to a data processor, and estimating the actual temperature of the outer surface of the chamber based on the thermal image. Support for this limitation may be found at, for example, original Claim 9.

Applicant submits that Claim 20 also complies with U.S.C. § 112. Claim 20 recites that the process of Claim 9 further comprises adding aluminum fluoride to the electrolyte at about a standard addition rate for each of the plurality of electrolytic cells that have an actual temperature that is about equal to a corresponding target temperature. Support for this limitation may be found at, for example, original Claim 12.

In view of the foregoing, Applicant submits that all pending claims comply with 35 U.S.C. § 112.

**Rejections Under 35 U.S.C. § 103**

The Examiner has rejected Claims 1-3 and 6-20 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,668,350 to Desclaux et al. ("Desclaux") in combination with U.S. Patent No. 6,440,294 to Cotton ("Cotton") and U.S. Patent Publication No. 2002/0146057 to Barron, Jr. et al. ("Barron, Jr."). The Examiner states that Desclaux discloses a method for controlling the rate of aluminum fluoride addition to an aluminum electrolytic cell using the known ratio between temperature and bath ratio. The Examiner admits that Desclaux does not disclose crust hole repair or sensing the temperature of an electrolytic cell chamber using infrared. The Examiner further states that the "subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the instant invention was made because even though the prior art of Desclaux et al others does not disclose crust repair or the use of sensing infrared radiation using an infrared sensor, the prior art . . . shows that . . . the use of an infrared sensor for use with target materials such as aluminum to detect the temperature of the aluminum material remote from the material is known to the person having ordinary skill in the art."

In response to Applicant's prior arguments, the Examiner states: "the examiner has shown that the use of infrared radiation using an infrared sensor with respect to detecting the temperature of aluminum material remotely from the material is known to the person having ordinary skill in the art. The examiner in charge of this application has shown this as being the motivation to use infrared sensors for detecting temperature of aluminum material."

Applicant respectfully notes that the infrared sensor of the instant invention is being utilized to sense the "outer surface of the chamber" and not aluminum. Thus, Applicant respectfully submits that although the Examiner may have illustrated that infrared energy can be used to detect a temperature of an aluminum material, that illustration has no bearing on whether it is obvious to sense the outer surface of an electrolysis cell chamber, as required by the instant claims.

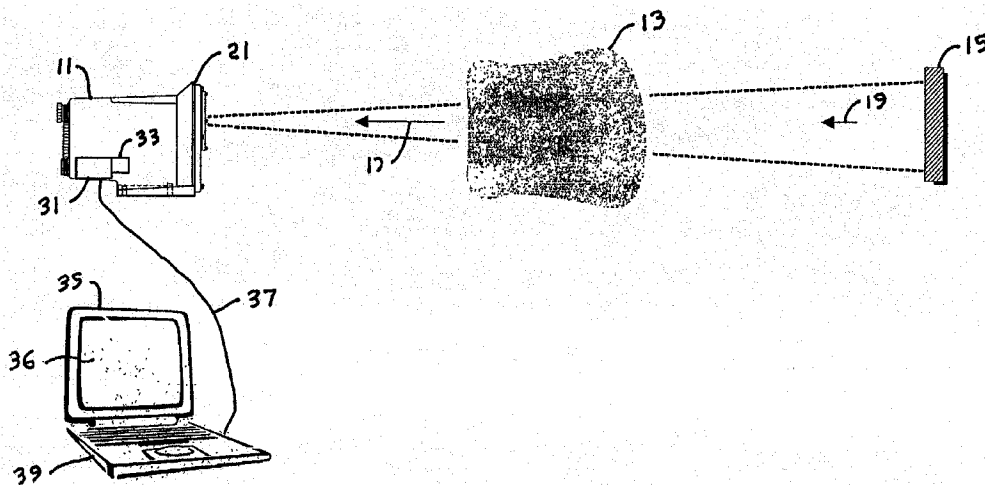
The Examiner further states:

"Temperature measurements are made in a conventional manner have been typically used in the determination of operating parameters of conventional electrolytic aluminum cells, so to use a new infrared sensor to measure the temperature which gives an almost immediate response would be a motivation to allow the cell faster response times. As with infrared sensors used to measure the temperature in an ear drum, the response time is fast and almost

immediate versus, a regular thermometer which takes time to respond when placed in the mouth. The same concept is true with an aluminum bath, if you used conventional temperature measuring techniques, the response time will be much slower than if an infrared sensor is used which shows almost immediate response times, which will allow the cell operation to be controlled in a more rapid time frame. Therefore, it appears that there is proper motivation to use such a device in the method as set forth in applicants instant claims.”

Applicant respectfully submits that this statement is not supported by any of the cited documents, and hence is merely a conclusory statement based on hindsight, which is not sufficient support for an obviousness rejection. (*see In re Kahn*, 441 F.3d 977 (Fed. Cir. 2006) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements.”)) Indeed, the Examiner has cited no documents that explicitly disclose, teach or suggest the use of an infrared sensor to sense infrared radiation of an outer surface of an electrolysis cell chamber, as required by the instant invention.

Desclaux discloses measuring cell temperature, but only “by means inserted in the side wall, or the floor, or in a cathode current collector in the cell floor”. Desclaux, Col. 2, lines 10-16. As admitted by the Examiner, Desclaux does not disclose the use of an infrared sensor to sense infrared radiation on the outer surface of the reaction chamber. Neither Cotton nor Barron, Jr. disclose the use of an infrared sensor to measure infrared radiation on the outer surface of an electrolysis cell chamber. Cotton makes no mention of infrared sensors. Barron, Jr. does disclose a radiometric temperature sensor, an embodiment of which is illustrated below.



Barron, Jr. states:

“the accuracy of an indicated temperature reading obtained by a radiometric temperature sensor 11 may be affected by the presence of intervening media 13, such as smoke, dust, steam, windows, spray, or mechanical obstructions, where the media 13 is present between a remote target 15 being measured and the radiometric temperature sensor 11 . . . . The target 15 may be a selected material, such as glass, aluminum, or silicon, and/or a selected product, such as a block, a rod, or a wafer. The radiometric temperature sensor 11 functions by using an internal infrared temperature sensor (not shown) to collect incident infrared energy 17. In the example provided, the incident infrared energy 17 comprises emitted infrared energy 19 originating at the target 15 and modified by the intervening media 13. The internal infrared temperature sensor uses an optical system 21 to collect the incident infrared energy 17 from the target 15 being measured. A temperature measurement is determined from data obtained at one or more wavelengths of the collected infrared energy 17 as is well-known in the relevant art.” (Para. 0014-00015; emphasis added)

Barron, Jr. also states that his method “can be applied [to] include remote temperature sensing of the following groups of materials and products:

- Aluminum and other nonferrous metals
- Galvannealed steel
- Glass molds
- Molten metals
- Small wires
- Semiconductor substrate wafers
- Stainless steel
- Welded tubes”

(Para. 0033-0041). Barron, Jr. provides no further relevant disclosure relating to the target material 15 and, thus provides no explicit teaching with respect to the use of infrared sensors and electrolysis cells chambers. Hence, Barron, Jr. does not explicitly provide for sensing infrared radiation of an electrolysis cell chamber, and thus the Examiner cannot utilize the explicit disclosure of Barron, Jr. to establish an obviousness rejection. In re Kahn

Applicant realizes that an explicit teaching is not required to establish obviousness, and it appears that the Examiner may be trying to establish an implicit obviousness rejection. (“A suggestion, teaching, or motivation to combine the relevant prior art teachings does not have to be found explicitly in the prior art, as the teaching, motivation, or suggestion may be implicit from the prior art as a whole, rather than expressly stated in the references”). In re Kahn. Applicant notes that an implicit showing may be established by evaluating the

knowledge of one of ordinary skill in the art in combination with the nature of the problem(s) solved by the cited reference(s) and the application at issue.

“The test for an implicit showing [of obviousness] is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art. . . . rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” In re Kahn (emphasis added).

Applicant respectfully submits that the mere conclusory statements provided by the Examiner in his response to Applicant’s prior arguments do not provide a basis to establish a *prima facie* case of obviousness. Moreover, the problem solved in Barron, Jr. is very different from the problem solved by the instant invention.

As noted above, Barron, Jr. senses the temperature of a target 15 using a radiometric temperature sensor 11. Barron, Jr. notes that his invention provides a solution to overcoming the issue of interference from intervening media 13.

“Accordingly, when one or more of the above adverse conditions is present, the temperature reading indicated on the display (not shown) of the radiometric temperature sensor 11 may become unreliable or inaccurate. Accordingly, the user of the radiometric temperature sensor 11 would have no way of knowing that the displayed temperature reading is incorrect. This problem is overcome in the radiometric temperature sensor 11 by also using two additional signal parameters derived during the process of collecting the incident infrared energy 17.” (Barron, Para. 0016; emphasis added)

Thus, the invention of Barron, Jr. relates to a problem with adverse conditions during temperature measurement. Conversely, the present invention solves a problem relating to process control for electrolysis cells by controlling additions of feed materials and/or by inspecting various features of the electrolysis cells, such as the crust. (Para. 0007-0010 of the instant application). These disparate purposes clearly evidence that it would not be implicitly obvious from the teachings of Barron, Jr. to utilize an infrared sensor to sense infrared radiation of an electrolysis cell chamber. In re Kahn.

In view of the foregoing, Applicant submits that Claim 1 is non-obvious over the art of record and therefore allowable.

For many of the same reasons, Independent Claims 9 and 11 are also not obvious. Both of those claims require the sensing of infrared radiation on the outer surface of a chamber of an aluminum electrolytic cell. As noted above, a *prima facie* case of obviousness cannot be established with respect to this limitation. Hence, both Claims 9 and 11 are also patentable.

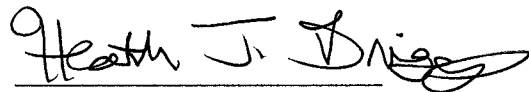
In light of the above amendments and remarks, Applicant respectfully submits that all pending claims are in condition for allowance, and such action is respectfully requested. If the Examiner believes that it would be helpful to discuss any of the amendments or remarks presented herein, the Examiner is invited to contact the undersigned at the telephone number provided.

It is not believed that any additional fees are due in connection with this response. However, any necessary fees may be charged to Deposit Account No. 01-1000.

Respectfully submitted,

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